

First record of Van den Berg's Pearlfish, *Austrolebias vanderbergi* Huber, 1995 (Cyprinodontiformes: Rivulidae) in Bolivia with comments on its diet and reproductive biology

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ABSTRACT: We report a new record of *Austrolebias vanderbergi* from the Gran Chaco of southeastern Bolivia and present a distribution map with known localities for this species. We also provide information on the diet and female fecundity of these Bolivian specimens.

The fish of the genus *Austrolebias* are distributed across the South American countries of southern Brazil, Paraguay, Uruguay, and northern and northeastern Argentina (Costa 2006), and southeastern Bolivia (Osinga 2006). Van den Berg's Pearlfish, *Austrolebias vanderbergi* (Huber 1995), is a Neotropical annual killifish that inhabits temporary ponds formed during the rainy season. The previously known distribution of *A. vanderbergi* is from the Río Paraguay-Parana basin in Paraguay and Northern Argentina (Huber 1995; Costa 1998; 2006). Identifying characteristics for this species include: urogenital papilla not attached to anal fin; rounded dorsal and anal fins; dorsal-fin origin posterior to anal-fin origin, anal-fin base with 3-5 rows of scales; and dorsal-fin base lacking scales (Costa 2006). Males and females are strongly sexually dimorphic (Figure 1). Males differ from females by being larger in size, in pigmentation pattern of preserved specimens (Figure 1) and live coloration. Live males having light bluish gray or pale golden flanks with 12-18 narrow, faint gray bars on the sides of body, and a dark supraorbital bar that doesn't reach the supraorbital neuromast (Figure 1a). Likewise, females have a light yellowish brown body with vertical rows of dark gray spots forming bars, two black spots on anterocentral portion of flanks and a yellowish ventrum (Figure 1b). Although pictures of live specimens are not provided, we were able to take annotations of the live coloration pattern in the field. For instance, males were similar to Costa's (2006) description possessing blue-gray flanks but the bars were darker, more black than gray in their color. Females were less colorful than the males, possessing a more uniform grey body color with yellowish ventrum and two black spots on the anterocentral portion of their flank. Females possessed extremely faint vertical bars on their flanks.

In his original description, Huber (1995) used specimens collected in Paraguay, from President Hayes Province near Fortín Toledo (22.27° S, 60.54° W). In the taxonomic and phylogenetic revision of the genus

Austrolebias, Costa (2006) examined only paratypes from Paraguay and Argentina. Individuals of *A. vanderbergi* were collected during a series of pond surveys in March and April 2011, in the Gran Chaco ecosystem, a flat, continuous semiarid tropical dry thorn forest of southeastern Bolivia. Specimens were collected using a modified pipe-sampler ($A = 1.3 \text{ m}^2$; Skelly 1996) which was cleared with a dipnet (mesh size = 2 mm) and with time-constrained dipnet surveys. This new record was collected from two temporary forest ponds (mean pond length = 121.14 m; mean pond depth = 60.75 m; mean pond forest cover = 78%) near the Isoceño community of Kuaridenda (19.17336° S, 62.58801° W and 19.17630° S, 62.58920° W), Province Cordillera, Department of Santa Cruz, Bolivia (Figure 2). All individuals captured were immediately fixed in 10% formalin and later stored in 70% ethanol for final examination. Specimens collected and analyzed were deposited at the Texas Cooperative



FIGURE 1. *Austrolebias vanderbergi*: A) male and B) female collected in temporary ponds near Kuaridenda. Photos by Carmen G. Montaña.

Wildlife Collection (TCWC 15182.01, 15183.01, 15184.01) in Texas A&M University (TAMU), Texas, U.S.A. Additional specimens not examined in this study were deposited in the Museo Noel Kempff Mercado in Santa Cruz, Bolivia.

Of the 185 specimens examined, 105 were males and 80 were females. Measures based on body standard length (SL) showed males are larger (range = 18.8 mm – 33.5 mm, average = 32.6 mm) than females (range = 17.8 mm – 28.7 mm, average = 23.5 mm). In the specimens examined by Costa (2006), both males and females possessed longer standard lengths; the five males he examined ranged from 52.0 mm to 68.3 mm SL, and the five females ranged from 36.8 mm to 52.3 mm SL. Although nothing is said about the time of collection, his specimens were probably collected at the end of the rainy season (May) allowing the fish more time to grow as compared to our specimens which we collected in the middle of the rainy season (March and April). Dietary data of 40 stomach contents (20 males; 20 females) examined showed that *A. vanderbergi* fed primarily on aquatic invertebrates including rotifers, ostracods, cladocera, copepods, bryozoa, and chironomids (Diptera). Chironomids and amorphous detritus were the most common food items by both frequency and volume in the stomachs examined.

Of the 20 female *A. vanderbergi* examined, all contained eggs ranging from immature to mature developmental stages (oocyte's diameter range: 0.2 mm – 1.7 mm; average diameter: 1.1 mm). Average of absolute fecundity (A_F) observed was 32 eggs per female, with the highest A_F observed of 60 eggs in a female of 28 mm SL and minimum of 21 eggs in a female of 23.1 mm SL.

The Gran Chaco occurs in the countries of Argentina, Bolivia, Brazil, and Paraguay, and is among the most threatened ecosystems in the world, experiencing one of the highest rates of forest loss (Zak *et al.* 2004). Fish surveys in this area of the Gran Chaco are lacking (Taber *et al.* 1995) and relatively little is known about the fish fauna of this region, in terms of both occurrence and natural history (Rosa Leny Cuellar, pers. com). This note reinforces the lack of knowledge about the occurrence of the Cyprinodontiformes, family Rivulidae in the Paraguay-Bolivia basin in Bolivia. Killifish that occur in this region, such as *Trigonectes* sp. (pers. obs.), *Neofundulus* cf. *ornatipinnis* Myers, 1935 (pers. obs.), *Austrolebias monstrosus* Huber, 1995 (Osinga 2006), as well as *A. vanderbergi*, that rely on temporary, forested ponds as habitat may experience reduction in habitat quality as forest continues to be cleared.

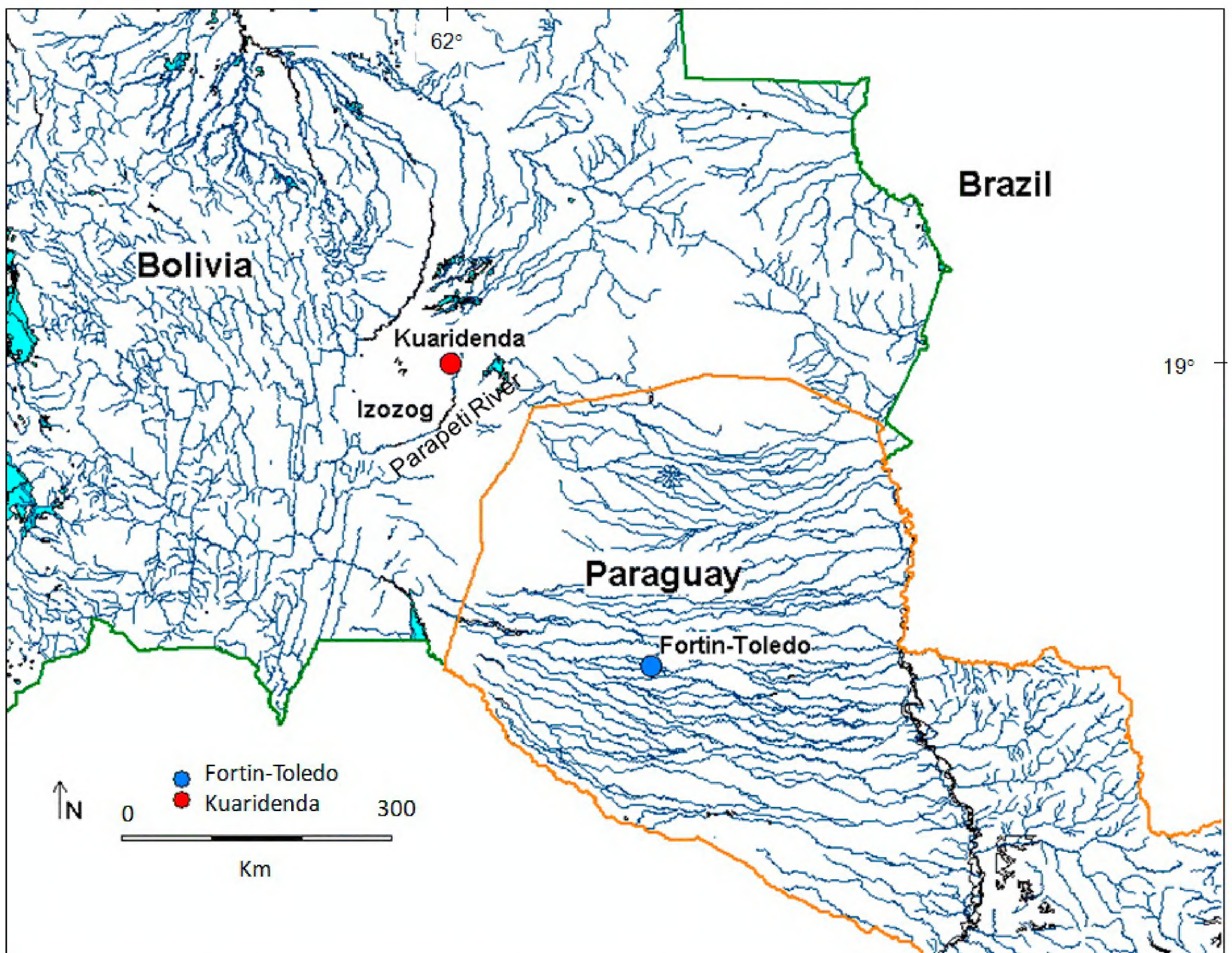


FIGURE 2. Map showing the geographic distribution of *Austrolebias vanderbergi*. Blue dot represent previous records (Huber 1995) and red dot represent the new record of *A. vanderbergi* in the Bolivian Gran Chaco.



FIGURE 3. Habitats of *A. vanderbergi* in the Isoceño community of Kuaridenda. A) Temporary pond located in Kuaridenda. B) Another temporary pond located in Kuaridenda, approximately 100 meters from the pond depicted in Figure 3A.. Photos by Christopher M. Schalk.

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